



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

UNCL. BY DOE
NOV 84

FEB 5 1969

The President
The White House

Dear Mr. President:

I am writing in response to your request for a recommendation of means to accelerate the further development of peaceful uses of nuclear energy. I shall focus first on the peaceful uses of nuclear explosives - the Plowshare program - and then on some other areas of great potential importance.

Of the numerous possible Plowshare excavation projects throughout the world, by far the most ambitious and best known is the sea-level transisthmian canal. To develop nuclear excavation technology and to permit the Atlantic-Pacific Interoceanic Canal Study Commission, established by P.L. 88-609, to determine its feasibility, the AEC needs to complete a minimum program of cratering experiments before December 1, 1970. Three such experiments were conducted in 1968, but additional experiments are required. One new exciting project that could provide essential experimental data, thereby replacing a planned U. S. experiment (GALLEY) and furthermore serving a useful purpose, is the proposed Australian harbor project (Cape Keraudren in Western Australia). We are prepared to proceed expeditiously with the joint feasibility study of that project.

In the Plowshare underground engineering area, we are working in close cooperation with industry, and several U. S. companies are prepared to contribute a major part of the cost required to carry out joint experiments in natural gas production and storage and in copper and shale oil recovery. Industry is urging AEC to accelerate its development of the special nuclear explosives for such applications.

To accomplish the excavation and explosive development program, the AEC will need additional new obligational authority of about \$20 million in its Fiscal Year 1970 budget, corresponding to additional expenditures of about \$15 million. In fact, we will not be able to meet the schedule of the Canal Study Commission or undertake the Australian harbor project if these funds are not provided.

The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Underwater permits all underground nuclear explosions, except those which cause "radioactive debris to be present outside the territorial limits" of the nation concerned. Accordingly, the treaty presents no obstacle to underground engineering projects since they are designed to fully contain the radioactivity. It does present a potential obstacle to underground nuclear explosions for excavation experiments and projects such as the Australian harbor and the sea-level canal where a very small amount of radioactivity must be released to the atmosphere. An overly restrictive interpretation of the treaty would foreclose these excavation experiments and projects. There has been a tendency on the part of some in the United States Government to interpret "radioactive debris to be present" if it is detectable with the most sensitive means available to modern science - a moving target since we are steadily increasing our sensitivity of detection to a fantastic degree. Literally, on a "one-atom-at-a-time" basis, we now have reached the point where from nuclear explosions we can detect a concentration of radioactivity as small as one atom in a room full of air. The USSR has not followed a narrow interpretation of the treaty in the conduct of its underground nuclear explosion programs. Narrowly interpreted, the Soviets could be said to have caused "radioactive debris to be present" outside Soviet territory about 25 times since the treaty came into effect.

The Commission consistently has maintained that there is room and precedent for reasonable and defensible interpretations of the treaty that would permit future excavation experiments. For example, most radiation protection guides, including those of the International Atomic Energy Agency, the International Commission on Radiation Protection, the USSR, and the U. S., contain definitions of concentrations of radioactivity below

which the radioactivity is considered to be "not present" insofar as such guides are concerned. This phrase, "not present," is the inverse of the phrase "to be present" in the treaty. Significantly, the health guide definition of "not present" has been applied by the U. S. to reactor operation under the Antarctic Treaty without objection by the other parties, including the Soviets. We believe that the adoption of such a reasonable standard would permit the Australian harbor project to go forward; however, confirmation of this judgment should await the results of the joint U. S. - Australian feasibility study.

In the long term, amendment or other formal arrangement under the treaty, by agreement with a majority of the treaty parties, including the Soviets, will be needed for projects such as the sea-level canal; however, this will be a time-consuming and difficult undertaking.

We recommend proceeding with excavation experiments and projects, including those mentioned above, to develop nuclear excavation technology on the basis of a suitable and reasonable treaty interpretation. In parallel, and looking ahead to the long-range question of an amendment or other formal arrangement, we endorse, as a first step, having technical talks on Plowshare with the Soviets - talks in which they have expressed a willingness to engage. Our information on Soviet activities indicates a strong and continuing program in the peaceful uses of nuclear explosives.

There also are a number of other exciting developments in our programs for peaceful applications of nuclear energy which in our judgment will merit your attention in the coming months. These include the development and demonstration of nuclear electric power stations which breed more fuel than they consume (the breeder reactors); the prospects of vast nuclear electric agricultural and industrial complexes, including the large-scale desalting of sea water (for example, a Mid-east project proposed by General Eisenhower); and the development of reliable, long-lived artificial hearts powered by radioisotopes. We believe that additional progress in these programs can be made by the adjustments in the revised FY 1970

The President

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budget we shortly shall submit in response to Budget Director Mayo's request of January 23, 1969; however, to realize fully the promise of these programs, it will be necessary to provide for further acceleration in future budgets..

Respectfully,

(Signed) Glenn T. Seaborg

Glenn T. Seaborg
Chairman

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